



Carefree Highway Project Summary

Purpose of Study

Alternatives Evaluation

Schedule

Contacts

Carefree Traffic Interchange Project Overview



The Carefree Traffic Interchange (TI) is located at approximately Milepost 224 on Interstate Highway 17 (I-17) where Carefree Highway/State Route (SR) 74 crosses over I-17, approximately 23 miles north of downtown Phoenix and nine miles north of SR 101L. It is located in Maricopa County within the City of Phoenix.

Carefree Highway/SR 74 provides access from I-17 to residential, commercial, and recreational areas. East of I-17, it continues for approximately 12 miles to end at the intersection with Scottsdale Road. West of I-17, SR 74 extends approximately six miles, and then proceeds northwest after crossing the New River to its intersection with US 93, approximately 10 miles southeast of Wickenburg. A site map of the area is shown to the left.

Beginning in 1999, ADOT began an investigation to add capacity and improve traffic operations at the Carefree TI. Those improvements were studied concurrently with other improvements to I-17 from SR 101L to Black Canyon City. Several TI improvement concepts were developed and evaluated; the results were presented to the public and to local, State, and Federal agency representatives between 2000 and 2003. In 2004, the final conclusion of that study recommended construction of a new interchange incorporating twin roundabouts. ADOT immediately began final design with the intent to construct the improvements in early 2005. However, due to an outpouring of opposition from the community, plans for construction of the roundabout improvements were stopped. In response to the desires of the community, ADOT has initiated a re-evaluation study to find the best solution to improve the traffic operations at the I-17/Carefree Highway TI.

ADOT currently plans to complete this the re-evaluation by the end 2005 and will begin final design of the selected improvement alternative immediately thereafter. The full schedule of the study/design/construction activities is provided below.

Purpose of the Study

Need for the Project

The I-17/Carefree Highway TI is a major access point to the Lake Pleasant Regional Park, the Ben Avery Recreation Area, several communities including Tramonto and Desert Hills, and developing areas in the North Gateway Village area of the City of Phoenix. Other improvements proposed in this area include construction of a new Arizona Game and Fish Department headquarters and maintenance operations facility on the Ben Avery site, construction of a regional mall on the southwest quadrant of the interchange, new commercial development on the southeast quadrant of the interchange, and a connection to the close connection to North Valley Parkway. In addition, the interchange provides access to SR 74, which connects with US Route 93, providing the primary link between the north Phoenix area and Wickenburg, Kingman, and Las Vegas.

Constructed in 1964, the current I-17/Carefree TI incorporates a “spread diamond” ramp configuration, with the Carefree Highway crossing over I-17. It currently experiences heavy congestion during the peak morning and afternoon commuting periods, and during the weekend from the heavy recreational traffic. Considerable growth is expected to continue in this area over the next 20 years, with traffic more than doubling on I-17 and commercial/residential traffic increasing accordingly on the Carefree Highway/SR 74.



ADOT's plan to construct the new Loop 303 interchange approximately 2 miles south of the Carefree Highway TI will ultimately redirect much of the SR 74 traffic by providing a new connection to the recreation areas west of I-17. Despite this potential reduction in traffic, the Carefree Highway TI does not have the capacity to handle the projected traffic volumes arising from the expected growth in the area. The capacity of the existing TI is limited by the stop-sign controlled ramp intersections, single-lane ramps with limited storage, and narrow width of the existing overpass structure. In addition, the existing overpass is too short to span the future width of I-17, and will therefore need to be reconstructed to accommodate the I-17 widening.

Study Objectives

The primary objectives of this study are to find the optimal configuration for the Carefree Highway TI that would accommodate projected traffic volumes, the future expansion of I-17, and planned one-way frontage roads that will be constructed by the City of Phoenix on both sides of I-17 between Carefree Highway and Happy Valley Road. To increase capacity, new through and turning traffic lanes are needed within the TI. The interchange improvements, together with the addition of lanes on the I-17 freeway, are anticipated to reduce congestion and delays and improve the safety and operation of the interchange.

To achieve consensus on how to best achieve the capacity and operational efficiency of the interchange, ADOT is working with its partnering agencies and the local and regional stakeholders of this facility to review and provide input on various improvement options. The agency and public involvement plan for the project includes three major phases: scoping, development, and evaluation.

Scoping Phase: For this phase, the study team will meet with the federal, state, and local representatives in an agency scoping meeting, as well as with community groups and the general public in meetings to gather their issues, concerns, and potential opportunities for improving this intersection. A total of five meetings are planned including one with the public agencies (August 18, 2005), a focus group meeting with each of the communities of Desert Hills (September 6, 2005), Tramonto (September 7, 2005), and the North Gateway Village Planning Committee (September 8, 2005), and finally with open public meeting for the public at large (September 22, 2005). Included with this process will be a presentation of all of the various interchange configurations that have been studied to date, and all of those suggested for further consideration since the previous study was conducted. The focus of these meetings is to gather input from the agencies and the local residents on what should be included in the final concept.

Development Phase: For this phase, the study team will develop concepts that incorporate the comments gathered during the scoping phase. The pros and cons of each alternative will be summarized, including the construction costs and operational efficiency of each alternative. After evaluating all of the concepts proposed, a preferred alternative will be prepared.

Evaluation Phase: We will present the results of the development phase to the agencies and the public for further consideration and comment. All alternatives will be summarized, with a preferred alternative proposed for construction. All comments received will be evaluated to determine if there is consensus on the preferred alternative, or if modifications to the concept is required before making the final recommendation for construction. With the completion of the evaluation, the concept will proceed into final design and ultimately into construction when the necessary funds are budgeted.

Alternatives Evaluation

All of the alternatives must provide the capacity and operational requirements of the interchange. Some of the general requirements that the various concepts must incorporate include:



- Capacity to meet the operational requirements for traffic into the year 2025. Using the Maricopa County Association of Governments (MAG) traffic model, make projections of the future traffic needs for each direction of travel taking into account the current developments, proposed developments, and available for future developments, as well as the past and projected growth rates for the area.
- Accommodate the future widening of I-17, incorporating the recommended 5 five general use lanes and plus an HOV lane (5+1) in each direction south of the Carefree Highway, and four general use lanes plus an HOV lane (4+1) in each direction to the north.
- Accommodate the one-way northbound and southbound frontage roads located south of Carefree highway, which that must retain full directional access at the termination with Carefree Highway. Frontage roads are not planned north of the Carefree Highway.
- Maximize the use of the existing right-of-way (R/W) available at the existing interchange area.

Alternatives Considered, but NOT Carried Forward

System Interchange: A system interchange provides full access to each direction of travel without the need to stop or regulate the traffic (such as the “Stack” at I-17 and I-10, or at the SR 101L/I-17 interchange). These are typically used at the intersection of two major freeways. While this layout provides great convenience to those using it, the Carefree Highway site does not warrant such an interchange as the traffic volumes and turning movements are lower than needed to justify the cost of a system interchange. To fit the many levels necessary to build the ramps, the area required to build such an interchange is large, and would not fit within the available R/W available. These ramps would also not allow access to most of the properties within a half mile of the interchange. Finally, this type of interchange would conflict with the new Loop 303 interchange constructed just two miles to the south due to ramp length requirements. Therefore, this type of interchange is not being carried forward.



Roundabout Interchange: While the roundabout has many operational and cost advantages, ADOT is honoring the request of the Maricopa County Board of Supervisors, the City of Phoenix, and the many residents who responded through their local government representatives that this type of interchange not be considered here.

Cloverleaf Interchange: This style was requested by many local citizens for consideration. It provides directional ramp access for each direction of travel without the need for traffic signals; however, it does not provide adequate access to or from the frontage roads to the south. With the heavy congestion in the peak hours, these transitions tend to cause traffic to stand still rather than flow freely as the directions conflict as the volume gets heavier. This is due to the necessary “weaves” between the entering and exiting traffic that must be completed in very short distances.

Alternatives Currently Being Considered



Single Point Urban Interchange (SPUI): In this alternative, Carefree Highway would carry three through lanes of traffic in each direction of travel, plus two left turn lanes in both the westbound-to-southbound and eastbound-to-northbound directions. All of the crossroad turning movements are focused at the center of the bridge with a single large traffic signal "bridge" used to control all directions of travel. For this type of configuration, the ramps are pulled in close to the freeway to minimize the need for R/W (especially in existing, developed urban environments). This results in the need for retaining walls between the freeway and the ramps. These interchanges are not as efficient as others when frontage roads are required.



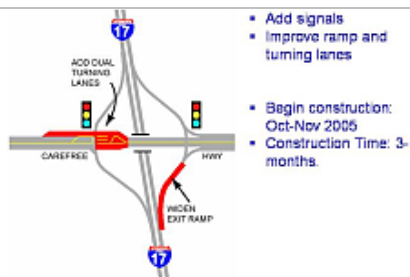
Tight Diamond Interchange: This concept is similar to the SPUI, however except it has separate signalized intersections at the termini of the east and west ramps with Carefree Highway. This design is also typical in urban environments, and it works better than the SPUI with frontage roads; however it too requires many long, tall retaining walls.



Spread Diamond Interchange: This configuration would be similar to the existing condition. In this alternative, Carefree Highway would carry three through lanes of traffic in each direction of travel, plus two left turn lanes in both the westbound-to-southbound and eastbound-to-northbound directions. The intersection, unlike today, would be signalized, and the ramps would be reconstructed to provide smoother transitions between I-17 and Carefree Highway/SR 74.



Partial Cloverleaf Interchange: Incorporating the benefits of the cloverleaf for two of the heavy left-turn movements and the efficiency and operational ease of the standard spread diamond, this option combines elements from the previous two alternatives into one solution.



Interim Improvements

To help alleviate some of the congestion and improve the operations of the current interchange, ADOT will be installing traffic signals and additional turn bays at the existing ramp terminals. These signals will help control traffic and eliminate some of the delays experienced during the heavy morning and afternoon peak commuter times when heavy left-turn traffic is delayed by the through traffic. A copy diagram of the concept is shown to the left.

Carefree Highway Activity Schedule

Study Efforts

September 22, 2005

Public Scoping Meeting

October, 2005

Study team to review/refine alternatives

November, 2005

Return to Agencies/Public with Alternative Recommendations

November 28, 2005

Submit Final recommendation to ADOT to begin final design

Design Efforts

Early 2006

ADOT to advertise for Final Design Contract and begin design of recommended Design Concept

Construction Efforts

Fall, 2005

Begin installation of the interim traffic signals on the ramps of the existing Carefree Highway Traffic Interchange. Construction should be complete within three 3 months.

Fall, 2007

Begin construction of I-17 Widening between Loop 101 and Carefree Highway

Key Team Member Contacts

Key members of the project team to contact for information:

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